natural capital – development and planning

Peter Jones, Daphne Comfort and David Hillier look at the concept of natural capital and consider some examples of natural capital initiatives within the UK

Pressures on natural resources within the UK continue to intensify – from, for example, continuing population growth and the need to feed and house increasing numbers of people; from corporate and political commitments to economic growth and to providing land to accommodate the commercial activity associated with such growth; and from new and improved transport facilities. In the face of these pressures the concept or metaphor of 'natural capital', defined by the Natural Capital Committee as 'the elements of the natural environment which provide valuable goods and services to people',[1] is attracting increasing attention from planners and environmental and economic policy-makers.

For example, the political consultancy Inline Policy has argued that 'the integration of a natural capital 'mindset' into policy could yield a more holistic set of future environmental policies'.[2] In her Foreword to the *Natural Choice* White Paper,[3] Caroline Spelman, then Secretary of State for Environment, Food and Rural Affairs, argued that the White Paper placed 'the value of nature at the centre of the choices our nation must make: to enhance our environment, economic growth and personal wellbeing'.

That said, progress in adopting natural capital thinking and in integrating it into policy-making in the UK has been slow, and the World Wildlife Fund has argued that 'the economic costs of failing to manage environmental impacts are already significant'.[4] The Natural Capital Initiative, for example, has argued that while 'there is great interest and activity around the natural capital concept' in order 'to realise the potential benefit of this there is a need for robust and coherently applied concepts, terms and principles that are based on sound science.'[5] And the Natural Capital Coalition has argued that 'until now natural capital has for the most part been excluded from decisions and when it is included it has been largely inconsistent, open to interpretation or limited to moral arguments.'[6]

With all this in mind, this article outlines the characteristics of natural capital, provides a number of examples of natural capital development initiatives within the UK, and offers some reflections on the application of the concept.

Natural capital

At a general level there is a consensus about the meaning of the term 'natural capital', but a variety of definitions can be identified. The World Forum on Natural Capital, for example, has defined natural capital as 'the world's stocks of natural assets which include geology, soil, air, water and all living things'.[7] The National Capital Committee offers a more expansive definition: 'the elements of nature that directly and indirectly produce value or benefits to people, including ecosystems, species, freshwater, land, minerals, the air and oceans as well as natural processes and functions'.[8] The Aldersgate Group, which describes itself as 'an alliance of leaders from business, politics and civic society that drives action for a sustainable economy' suggested 'the term natural capital is used to describe all natural resources that provide goods and services of value to people and our economy.'[9]

Furthermore, Voora and Venema have suggested that natural capital can be 'described as renewable or non-renewable [...] Renewable or active [natural capital] is self-maintaining due to its ability to harness solar energy', while non-renewable capital assets are 'formed over long geological time periods and [are] passive'.[10] The European Environment

Agency has suggested that natural capital comprises two components: 'abiotic natural capital' and 'biotic natural capital', with the former comprising 'subsoil assets (e.g. fossil fuels, minerals, metals) and abiotic flows (e.g. wind and solar energy)', while the latter 'consists of ecosystems, which deliver a wide range of valuable services which are essential for human well-being'.[11]

In the 18th century, economists identified land, which was seen to include all natural resources, as one of the factors of production, along with capital and labour. More recently natural capital has essentially been seen as one, arguably 'the most fundamental',[11] of a set of forms of capital that also includes financial capital, social capital, instructional capital and human capital. Sullivan[12] traced the origins of the 'metaphorical device' of natural capital back to the work of the economists Kenneth Boulding and Ernst Friedrich Schumacher in the 1960s and 1970s. Foster and Gough[13] suggested that the economist David Pearce first introduced the idea of natural capital in 1988 as a way of interpreting sustainable development.

A number of frameworks have been put forward to define, measure and account for natural capital, although such tasks are fraught with difficulties. The Natural Capital Committee, for example, identified three sets of difficulties:[8]

- that 'stocks of natural capital, are dispersed, interconnected and dynamic' and that 'they are difficult to circumscribe and therefore to count or measure';
- that 'part of the value of natural capital lies in these dispersed and interconnected characteristics' and that 'a key feature is the potential for natural capital to fulfil different functions and to function differently under changed circumstances'; and
- that 'natural capital stocks provide multiple values that are interdependent and interacting in ways that are currently very difficult to reflect effectively in any accounting process given existing data'.

Tani has outlined attempts to develop international frameworks and standards by the World Bank and the United Nations Environment Programme, but argued that 'there is no simple assessment that can be made about the depreciation of natural capital', and that 'until this is addressed our national accounts will provide erroneous signals about future economic prospects.'[14]

Such difficulties aside, the Natural Capital Coalition has provided a 'standardised framework to identify, measure and value impacts and dependencies on natural capital', which has a clear business focus.[6] This framework is based on four principles: namely, relevance, rigour, replicability and consistency. In addressing relevance, for example, the accent is on considering 'the most relevant issues' and 'including the impacts and/or dependencies that are most material for the business and its stakeholders'. In addressing replicability the focus is to be on ensuring that 'all assumptions, data, caveats and methods used are transparent, traceable, fully documented and repeatable'.

The framework then moves through a staged process which runs from identifying the rationale for a natural capital assessment, through defining objectives, scoping the assessment, determining impacts and dependencies, measuring impact drivers and/or dependencies, measuring changes in the state of natural capital, valuing impacts and dependencies, and interpreting and testing the results, to ultimately applying the results and integrating natural capital into existing processes.

Natural England and the Centre for Ecology and Hydrology have worked together to produce a suite of ten maps of aspects of natural capital within England.[15] The maps were produced at a 1 kilometre resolution using a range of data sets and are available to download as Geographical Information System data or as a high-resolution Portable Networks Graphic image. The maps and accompanying reports cover soil carbon, soil nitrogen, soil pH, soil phosphorous, soil bacteria, soil invertebrates, headwater stream quality, carbon in vegetation, nectar plant diversity for bees, and plant indicators for habitats. The report on soil carbon, for example, emphasises the essential roles that carbon plays as the primary energy resource in soils and in maintaining resilience and water retention, as well as its role in climate regulation.

More specifically, under the banner 'planning for sustainable land use', the Royal Institute of Chartered Surveyors (RICS) has developed a 'Natural Capital Planning Tool' (NCPT) designed to assess and manage the impacts of major developments and plans on natural capital.[16] While the National Planning Policy Framework[17] sought to emphasise the role of the planning system in recognising the benefits of ecosystem services provided by natural capital, RICS has argued that 'the government has not equipped developers and planning authorities with the necessary practical tools to assess and manage these benefits'.[16] That said, it recognised that it is difficult to translate national assessments of natural capital to the local level, where most planning decisions are made – and also suggested that many planners are not familiar with ecosystem services thinking and terminology and that many developers often lack natural capital and ecosystem expertise in-house.

In concluding its rationale for developing its NCPT, RICS argued that 'without assessing the impact of planning and development on natural capital and ecosystem services, planning authorities and governmental institutions will not be able to set the right incentives to protect and enhance these

valuable resources and therefore ensure sustainable land-use'.[16]

RICS 'tested' the NCPT via three case studies – a major housing development in Birmingham; a flood alleviation scheme in Rugeley; and the redevelopment of a manufacturing facility in Doncaster – and both Natural England and East Staffordshire Borough Council undertook a review of the NCPT.

Overall, RICS concluded that the NCPT 'can provide a very valuable additional information source to assess, monitor and manage the impact of proposed plans and developments on natural capital and ecosystem services in a holistic way',[16] but this endorsement was qualified with an acknowledgement that its 'outcomes are indicative rather than proven'. As such, the NCPT is seen as 'a stepping stone towards integrated management of natural capital and ecosystem services in a planning context – something that has not been mainstreamed to date'.[16] While the NCPT was developed specifically for England, RICS suggests that it could be adapted for application within other countries.

Natural capital is attracting attention from a growing number of policy-makers

Natural capital initiatives

In 2015 the Policy Exchange suggested that 'we have now moved to a point where the key question is not 'if' but 'how' to implement natural capital into policymaking'.[18] A small number of initiatives which aim to place natural capital centre stage are emerging within local authorities and Local Enterprise Partnerships in England.

Some illustrative examples provide insights into the nature of these initiatives. The Dorset Local Nature Partnership, for example, has produced a 'Natural Capital Investment Strategy for Dorset' under the banner *The Natural Place for Business*.[19] This strategy 'outlines how the aspirations for Dorset laid out by the Dorset Local Enterprise Partnership and in Local Authority plans can be achieved not just without damaging the natural resources on which our prosperity is built, but by enhancing them so that they become even more valuable to us in the future'. While the Local Enterprise Partnership is responsible for encouraging and facilitating economic growth, the Natural Capital Investment Strategy aims to 'increase the resilience of proposed development' and to 'enhance the natural environment', thus enabling the county to attract continuing inward investment.

Three brief case studies focused on infrastructure developments, development planning proposals and business investment illustrate the management and delivery of the strategy. In addressing infrastructure developments the focus is on achieving a net gain in natural capital, and the Weymouth Relief Road is cited as an example. Here, although the agreed route involved the destruction of a small area of irreplaceable ancient woodland and damage to the Dorset Area of Outstanding Natural Beauty, seven times as much high-value conservation land was produced as a result of the road development than was lost.

More specifically, the development facilitated the Lorton Valley Nature Park, and the Dorset Local Nature Partnership claimed that this park 'has made Weymouth a far better place to live and do business in, in addition to any direct tourism benefits'. More generally, the Dorset Local Nature Partnership claims that 'incorporating Natural Capital into development planning need not be difficult as the concept is

simple enough' and that 'the consideration of Natural Capital should not be seen as a burden', but rather as 'a means to ensure the environment stays healthy and productive and supports communities'.

In a similar vein the Surrey Nature Partnership has produced *Naturally Richer: A Natural Capital Investment Strategy for Surrey*.[20] Here, the vision is for 'a thriving, resilient and attractive county providing natural benefits to all who live and work here'. The strategy recognises both the status of, and the pressures on, natural capital in the county and emphasises the importance of woodland, heathland and wetland habitats.

In looking to set priorities for investment in natural capital over the period 2016-2021, the strategy emphasises the benefits that can be derived from woodlands, wetlands, urban green spaces, urban air quality and improvements in the environmental performance of farms. Woodland is seen to be particularly important in providing recreational opportunities, in mitigating air pollution, in flood alleviation and mitigation, and in providing access to green space. The Nutfield Marsh wetland restoration project, in the north east of the county, is cited as an example which saw the restoration of former mineral workings, flood alleviation for the town of Redhill, the creation of attractive and publicly accessible green space, and the provision of opportunities for business enterprise and development in the leisure industry.

'It is important to recognise that natural capital is a contested concept... At present the overwhelmingly dominant government and business policy responses to the perceived natural capital challenge are rooted in attempts to frame nature and natural resources in economic and financial terms'

London's Green Infrastructure Task Force, established following the publication of the London Infrastructure Plan in 2014, has developed a vision for the city which reflects the natural capital concept. This vision is that 'a high quality and well maintained green infrastructure is integral to keeping the city healthy, happy, moving and functioning'.[21] The goals are that by 2050 existing parks and green spaces will be integrated into a green infrastructure network; that both major new developments and regeneration areas will include green infrastructure; that many streets will be transformed into green areas of the public realm, where walking and cycling will have priority; and that green infrastructure decisions will be based on natural capital valuation.

The Task Force report *Natural Capital: Investing in a Green Infrastructure for a Future London*[21] includes a small number of case studies that provide specific examples of current thinking, including the Queen Elizabeth Olympic Park, Firs Farm Wetlands, Greening Business Improvement Districts, and Derbyshire Street Pocket Park. The Firs Farm Wetlands scheme, for example, will see the creation of a 4,000 square metre wetland habitat which will improve water quality, store 30,000 square metres of water, reduce the risk of flooding and provide new footpaths and cycle routes to a local school.

In a contrasting location the Northern Upland Chain Local Nature Partnership has produced *A Natural Capital Investment Plan*[22] for peatland in five protected landscapes – Northumberland National Park, the North Pennines Area of Outstanding Natural Beauty (AONB), the Yorkshire Dales National Park, the Forest of Bowland AONB, and Nidderdale AONB. The principal aim of the plan is 'to stimulate new investment in peatland – a key component of natural capital in the northern uplands', and the plan includes a call for investment in peatland restoration. In making 'the case for investment', it suggests that 'improving the condition of 130,000 hectares of degraded peatland will provide £460 million net benefit to society over 40 years just from reducing the amount of carbon being released into the atmosphere'.

Additional benefits from restoration are said to include improvements in biodiversity, reduced risks of flooding, improved grazing, and more cost-effective land management. Overall, the plan claims that the impact on natural capital would be an improvement in the quality and condition of soils, habitats, wildlife and freshwater.

Discussion

The concept of natural capital is attracting increasing attention and commentary, and there are growing calls for its integration into development proposals and planning policies. However, it remains to be seen whether local planning authorities will develop or commission the expertise to incorporate natural capital assessment into their planning policies or development control processes, whether businesses will incorporate natural capital into their corporate strategy and decision-making, and whether the calls for investment in natural capital schemes will meet with a positive response from investors.

Furthermore, it is significant that the previous Coalition Government rejected the Natural Capital

Committee's recommendation[1] that an investment programme for natural capital should be explicitly included in the National Infrastructure Plan. Rather, in response to the recommendation the Government stated 'we do, however, strive for all publicly funded infrastructure investments to make a positive contribution to protecting and enhancing our natural environment'.[23]

More generally, a number of issues merit discussion and reflection. First, it is important to recognise that natural capital is a contested concept. Gough has argued[24] that, as originally introduced by David Pearce in 1988, 'natural capital was a device to develop an approach to sustainable development from within the established dominant paradigm of economics', while for others 'it was fundamental to the mounting of a challenge to that paradigm which emphasised ecosystem processes and ecological knowledge over the accounting of environmental assets.'

More recently, Read and Scott Catto suggested[25] that these competing positions are deeply entrenched and that 'the argument between those who would substitute financial for natural capital' and those who see 'natural capital as primary and sacrosanct' is unlikely to be resolved. At present the overwhelmingly dominant government and business policy responses to the perceived natural capital challenge are rooted in attempts to frame nature and natural resources in economic and financial terms and to assess the financial value of natural capital.

Secondly, this throws the issues of measurement and accounting into sharp relief. In exploring the relationship between natural capital and economic theory Nadal recognised that 'the natural capital metaphor is currently being introduced to provide a framework for the economic measurement of environmental degradation.'[26] However, he argued that there were 'deep problems affecting the use of this metaphor' and that the 'natural capital approach will not be able to deliver on its promises to measure natural capital stocks or the stream of natural capital services'. More specifically, he suggested that the valuation techniques currently being used for natural capital have major limitations and that the 'data they generate may lead to gross misallocation of resources and cannot provide reliable guidance for environment policy-making.'

Fenichel and Abbott have argued that 'the value of natural capital remains crudely measured at best' and that 'the paucity of estimates of the value of natural capital that are grounded in economic capital theory suggests that in practice the treatment of natural capital remains largely metaphorical'.[27] Perhaps more polemically, Friends of the Earth Europe has argued that 'calculations of natural capital do not represent, and can rarely capture, the true value of nature' and that 'if the value of nature is expressed in purely monetary terms there is a high risk that nature can then be legitimately destroyed as long as a payment is made, often with a promise that nature will be protected or created elsewhere through offsetting schemes.'[28]

Thirdly, there are issues concerning the relationships between natural capital and sustainability. Christie, Lee and Murphy have suggested that natural capital 'has the potential to be a vital component in delivering local and national sustainability', but argued that natural capital 'risks being used as yet another measure of *relative* sustainability and resource efficiency gains' whereas 'it needs to be considered in the context of *'absolute sustainability''*.[29] The issues of both spatial and time scales can be important here. On the one hand, for example, increases in natural capital claimed for a development at the local scale may not enhance sustainability at regional, national or global scales. On the other hand, a claimed local net gain in natural capital associated with offsetting biodiversity losses may lead to the growth of invasive species, which in turn, may, over time diminish natural capital.

Christie, Lee and Murphy further posed the question 'in adding to natural capital, are we simply making *relative* gains that could be diminished or lost because of breaches in *absolute* sustainability boundaries?'[29] Rather pessimistically they concluded that 'extensions in natural capital cannot be enough to keep us, at global scale, within absolute ecological limits for development, such as the worldwide 'carbon budget' that must be respected if we are to avoid forced global warming of 2ºC or more.'

Conclusion

Natural capital has been described as 'probably the most pressing issue in the modern world'[30] and is attracting attention from a growing number of policy-makers. However, there are concerns that, while natural capital is a valuable concept or metaphor, as with all metaphors 'what may be gained in communication may be lost in precision', and that arguably its most serious shortcoming is 'that it is incapable of providing information on the drivers of environmental degradation'.[26] That said, planners and environmental policy-makers will want to maintain a watching brief on the natural capital debate.

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Notes

1 *The State of Natural Capital: Protecing and Improving Natural Capital for Prosperity and Wellbeing*. Natural Capital Committee, 2015. gov.uk/government/uploads/system/uploads/attachment_data/file/516725/ ncc-state-natural-capital-third-report.pdf

2 'Natural capital's future in UK policy after Brexit and the Protocol'. Webpage. Inline Policy, Jul. 2016. inlinepolicy.com/2016/natural-capitals-future-in-uk-policy-after-brexit-and-the-protocol/
3 *The Natural Choice: Securing the Value of Nature*. White Paper. Cm 8082. HM Government. TSO, Jun. 2011. gov.uk/government/uploads/system/uploads/attachment_data/file/228842/8082.pdf
4 *A Greener Budget: Choices for a Prosperous Future*. Summary Report. World Wildlife Fund, Feb. 2016. Available at assets.wwf.org.uk/downloads/a_greener_budget_2016_summary_download.pdf
5 *Valuing our Life Support Systems 2014*. Summary Report. Natural Capital Initiative, 2015. naturalcapitalinitiative.org.uk/wp-content/uploads/2015/06/Valuing-our-Life-Support-Systems-summit-report.pdf
6 *Natural Capital Protocol, Principles and Framework*. Natural Capital Coalition, 2016. naturalcapitalcoalition.org/wp-content/uploads/2016/07/Framework_Book_2016-07-01-2.pdf
7 'What is Natural Capital?'. Webpage. World Forum on Natural Capital. naturalcapitalforum.com/about/
8 *Towards a Framework for Defining and Measuring Changes in Natural Capital*. Working Paper 1. Natural Capital Committee, Mar. 2014. gov.uk/government/uploads/system/uploads/attachment_data/file/516946/ncc-working-paper-measuring-framework.pdf
9 *Investing In Our Natural Assets: How Government Can Support Business Action*. Aldersgate Group, 2015. aldersgategroup.org.uk/asset/download/172/Investing%20in%20our%20natural%20assets.pdf.
10 V.A. Voora and H.D. Venema: *The Natural Capital Approach: A Concept Paper*. International Institute for Sustainable Development, Mar. 2008 iisd.org/pdf/2008/natural_capital_approach.pdf
11 'Natural capital and ecosystem services'. Webpage. European Environment Agency, 2015. www.eea.europa.eu/soer-2015/europe/natural-capital-and-ecosystem-services
12 S. Sullivan: *The Natural Capital Myth; or Will Accounting Save the World? Preliminary Thoughts on Nature, Finance and Values*. LCSV Working Paper 3. Leverhulme Centre for the Study of Value, University of Manchester, Mar. 2014. thestudyofvalue.org/wp-content/uploads/2013/11/WP3-Sullivan-2014-Natural-Capital-Myth.pdf
13 J. Foster and S. Gough: 'Learning, natural capital and sustainable development: exploring the connections'. In J. Foster and S. Gough (Eds): *Learning, Natural Capital and Sustainable Development: Options for an Uncertain World*. Routledge, 2005, pp.1-16
14 D. Tani: 'Measuring natural capital'. *World Economics*, 2014, Vol. 15 (4), 45-58
15 The Natural England and Centre for Ecology and Hydrology natural capital maps are available at eip.ceh.ac.uk/naturalengland-ncmaps
16 *Planning for Sustainable Land-Use: The Natural Capital Planning Tool (NCPT) Project*. Royal Institution of Chartered Surveyors, Nov. 2015. rics.org/Global/Natural_Capital_Planning_070116_dwl_aj.pdf
17 *National Planning Policy Framework*. Department for Communities and Local Government, Mar. 2012. gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf
18 'Natural capital: moving from concept to implementation'. Webpage. Policy Exchange, Jul. 2015. policyexchange.org.uk/event/natural-capital-moving-from-concept-to-implementation/
19 *The Natural Place for Business*. Natural Capital Investment Strategy for Dorset. Dorset Local Nature Partnership, 2016. dorsetlnp.org.uk/hres/Dorset%20LNP%20Natural%20Capital%20Investment%20Strategy%202016.pdf
20 *Naturally Richer: A Natural Capital Investment Strategy for Surrey*. Surrey Nature Partnership, 2015. surreynaturepartnership.files.wordpress.com/2015/11/naturally-richer-a-natural-capital-investment-strategy-for-surrey.pdf
21 *Natural Capital: Investing in a Green Infrastructure for a Future London*. Green Infrastructure Task Force, 2015. london.gov.uk/WHAT-WE-DO/environment/environment-publications/green-infrastructure-task-force-report
22 *A Natural Capital investment Plan for Peatland in the Northern Upland Chain*. Northern Upland Chain Local Nature Partnership, 2015. nuclnp.org.uk/wp-content/uploads/2016/01/NUCLNP-Natural-Capital-Investment-Plan-for-Peatland.pdf
23 *The Government's Response to the Natural Capital Committee's Third State of Natural Capital Report*. Department for Environment, Food and Rural Affairs, Sept. 2015. nebula.wsimg.com/5369b38eedee241235c2013e3b3de064?AccessKeyId=68F83A8E994328D64D3D&disposition=0&alloworigin=1
24 S. Gough: 'Rethinking the natural capital metaphor: implications for education and learning'. In J. Foster and S. Gough (Eds): *Learning, Natural Capital and Sustainable Development: Options for an Uncertain World*. Routledge, 2005, pp.91-110
25 R. Read and M. Scott Catto: ''A price for everything?' The 'natural capital controversy''. *Journal of Human Rights & the Environment*, 2014, Vol. 5 (2), 153-67
26 A. Nadal: 'The natural capital metaphor and economic theory'. *Real World Economics Review*, 2016, No. 74. paecon.net/PAEReview/issue74/Nadal74.pdf
27 E.P. Fenichel and J. Abbot: 'Natural capital: from metaphor to measurement'. *Journal of the Association of Environmental & Resource Economists*, 2014, Vol. 1 (1/2), 1-27
28 *Nature is Not for Sale: The Dangers of Commodifying Our Natural World*. Friends of the Earth Europe, Jun. 2014. foeeurope.org/sites/default/files/publications/foee_position_nature_is_not_for_sale.pdf
29 I. Christie, J. Lee and R.J. Murphy: *Operationalising 'Absolute Sustainability' in Relation to Natural Capital*. Centre for Environmental Strategy, University of Surrey, 2016. naturalcapitalcoalition.org/wp-content/uploads/2016/07/University-of-Surrey-Nat-Capital-paper_final_logo.pdf
30 P.V. Kiosse and D. Otley: *Concepts of Capital: Applying the Metaphor to Sustainability*. Institute of Chartered Accountants in England and Wales, Mar. 2016. icaew.com/-/media/corporate/files/technical/sustainability/rethinking-capitals/kiosse-and-otley-concepts-of-capital.ashx?la=en